Hobbies WEEKLY

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The home carpenter can build

AN OTTOMAN

AN ottoman is a form of sofa or divan, but differs from either of these pieces of furniture in that it usually possesses a hinged seat lid, with a bottom compartment which is useful for storing blankets, etc. Moreover, it serves as a very comfortable bed for a child, and would thus be appreciated in the small home.

The great drawback, of course, is the present shortage of wood. Very few articles of furniture can be made without wood. In designing fairly large items, consequently, the designer has a rather difficult task. He has to reduce wood to a minimum, give a pleasing design, and arrange matters so the work is as strong as possible.

To save wood, the only alternative is a jointed framework. This means extra time, but if something is to be made in these times, extra labour is inevitable. Besides, a cheap material, such as deal, must be used, instead of the more usual hardwoods.

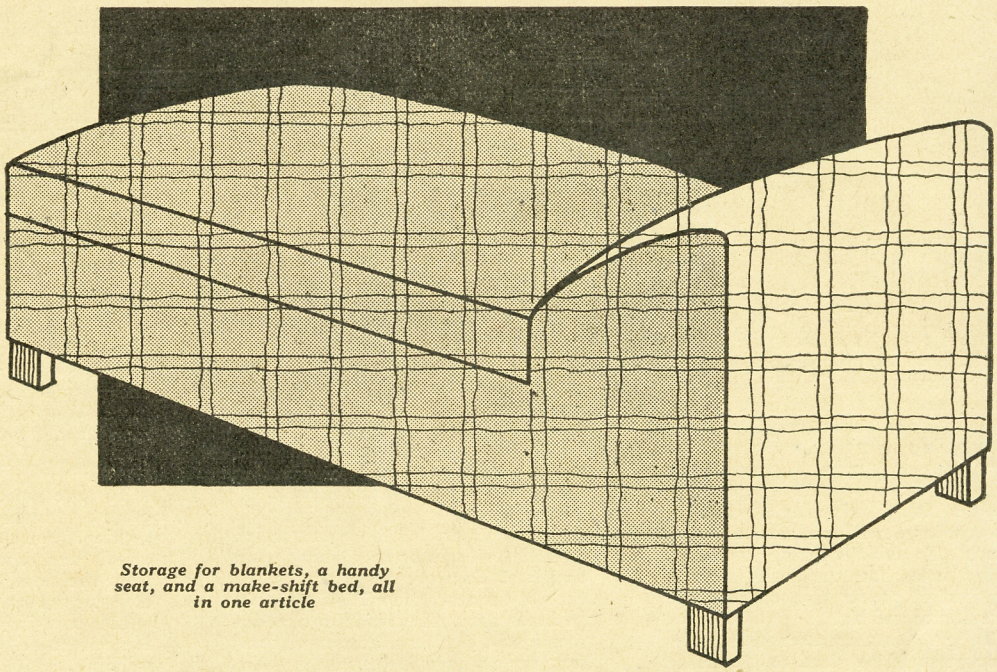
Frameworks certainly save a good lot of timber. For example, a single length of 10½in. by ⅞in. deal shelving, cut into 2in. wide strips, will make one side to the ottoman framework, as can be seen at Fig. 1.

As this framing is covered with the finishing material, which can be cheap ex-government army blanket, no panelling is necessary and the illustration gives some idea of the neat appearance of the completed ottoman.

So, now that you understand what must be done, which is not from choice, but necessity, work could be commenced on the side frames, these being made identical in size and shape. It is a matter of cutting the strips to length and dowelling them neatly together as shown.

Assembling Frames

The frames should be assembled without a twist. Owing to the length, it will not be possible to use an ordinary sash cramp (unless with extension piece) for pressing the parts together, particularly the leg pieces. In order to assemble the parts correctly, the small upright members



Storage for blankets, a handy seat, and a make-shift bed, all in one article

are dowelled between the horizontal members, then the leg pieces added. The head end upright is added, then the diagonal cross piece.

The head and foot end frames are shown at Fig. 2. Here, again, 2in. by ⅞in. wood is wanted. The foot end is easily cramped together. Respecting the head end, the central cross and upright members are dowelled together, then the side uprights attached and, finally, the top and bottom cross rails. As shown at Fig. 2, the end frames are affixed between the side frames, the feet of the latter serving for the former.

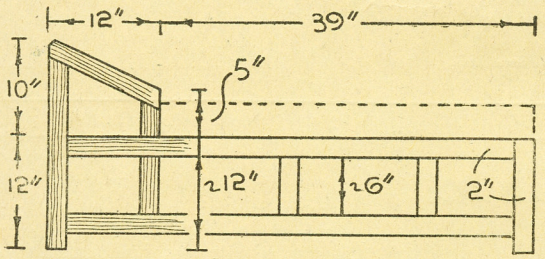


Fig. 1—Dimensions of side of frame

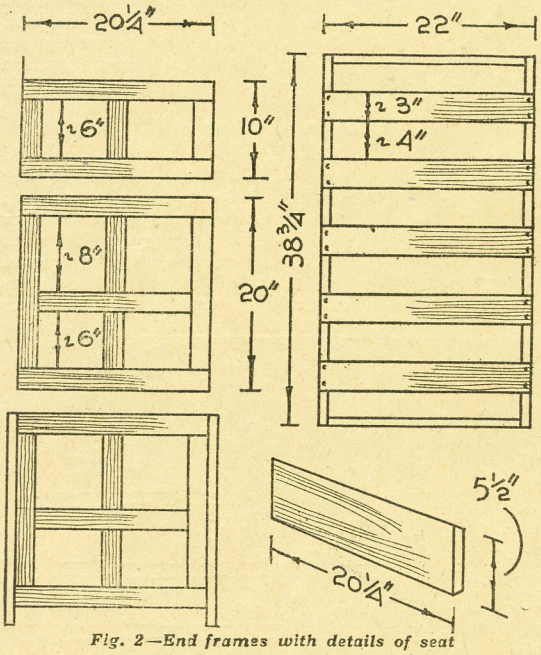


Fig. 2—End frames with details of seat

The frames are best assembled with glue and flatheaded iron screws, although oval nails may be used.

If nails are used, these should be 2in. long oval nails, but french or wire nails can be used as an alternative. No nail punching is necessary and the large heads will not matter so much. To avoid splitting the wood, make holes for the nails with a bradawl of proper size, or with the usual brace and bit.

To give further strength, corner blocks should be glued to the inside corners. Be sure to have the framework squared up beforehand.

The seat framework is shown at Fig. 3, with a top view at Fig. 2. The end and side pieces are 4ins. wide by ⅞in. thick. These are glued and screwed or lap-dovetailed and glued and screwed together.

The Seat Framing

A butt-joint, with glue and nails, will make quite a strong framing, however, and the strength will be further augmented when the cross pieces or slats are attached. These slats are 3ins. by ⅞in. and are attached about 4ins. apart. They are sunk level with the under edges of the seat framing.

The seat frame, when made, is hinged in place, temporarily, before upholstering it. Now, in the normal way, the seat is always spring-upholstered. Wire springs, three to each slat, are stapled on, then connected with strong sisal twine or cord to top mesh of webbing for covering and padding in the usual way.

If desired, the seat could be made so it takes a stuffed loose unit which is made to fit into the framing upon the slats. To prevent dropping at the ends of the seat, the end slats should be made about 6ins. wide to close up the gap. In fact, for neatness and comfort, try to have more than five 3in. wide slats across the framing by keeping them about 2ins. to 3ins. apart.

The stuffed unit should be 5ins. or 6ins. thick and the edges of the frame should be rounded over to prevent fraying. The frame, by the way, is covered at the outside and part of the inside with the finishing material.

The Head End Upholstering

The surface of the head end requires to be webbed for padding and covering. Therefore, a cross piece is attached between the frames, as in the view at Fig. 3, and this piece is detailed at Fig. 2.

As stated previously, army blankets serve as a final covering material. These blankets, sold cheaply, are dark and are used by many people for recovering settees, easy-chairs, etc. The stuff is soft, but it gives good wear and makes a very comfortable covering.

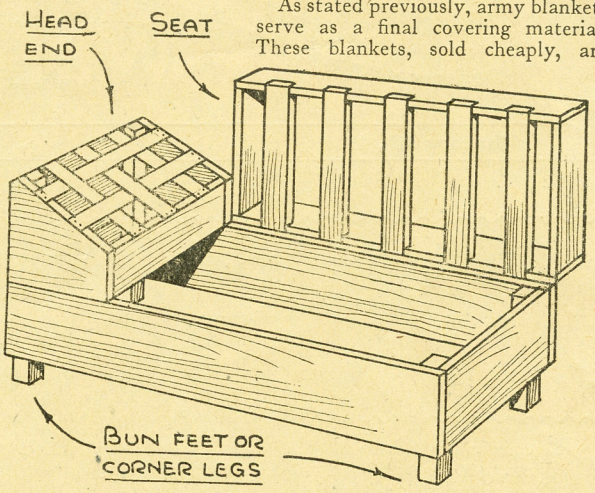


Fig. 3—General view of constructional work, from boards

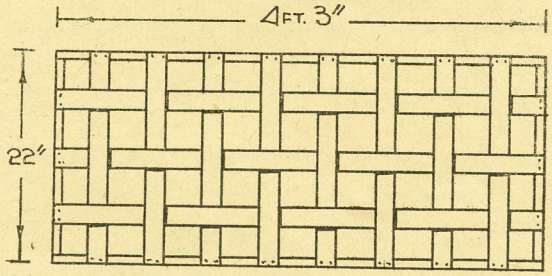


Fig. 4—Bottom may be laced with webbing

When being tacked on, it needs to be folded over to the inside, to make a good anchorage hem. Otherwise the tack heads may pull through the waft and warp threads. Use ordinary cut tacks or—for show purposes—the roundheaded bronzed variety.

A Webbed Bottom

To save wood, the bottom of the carcase framing is covered with sacking. An old sugar bag, washed, dried, and the stitching removed from the sides, provides material for covering the underside of the ottoman.

This covering itself is not sufficient. It needs to be braced with a mesh of webbing, which goes on top, interlaced after the suggested manner at Fig. 4.

Combine novelty, simplicity and usefulness in constructing

A FANCY SCREEN

WARMTH and protection from draughts are usually associated with screens of any kind. Warmth, in the way of colours can be obtained in the choice of material and colours. Protection from draughts is the key note, and the size of the screen must be governed by the purpose for which it is made. In the case of the medium size screen shown and described here, the writer had in mind the use to which it would most likely be put, and that was the protection from draught of the tiny tots during their daily bath.

The covering can be carried out quite cheaply by using oddments of stout wall paper or even stout brown paper distempered or painted and afterwards decorated with cut-out floral pictures stuck down or carried out in stencil fashion.

Simple Framework

The screen is of simple construction, and is made in two distinct leaves or panels hinged together, the diagram (Fig. 1) showing their measurements and method of dividing into large and small panels. The top and lower panels, measuring about 2ft. by 9ins., are solid and are filled in with composition material such as asbestos fibre board or, if obtainable, plywood.

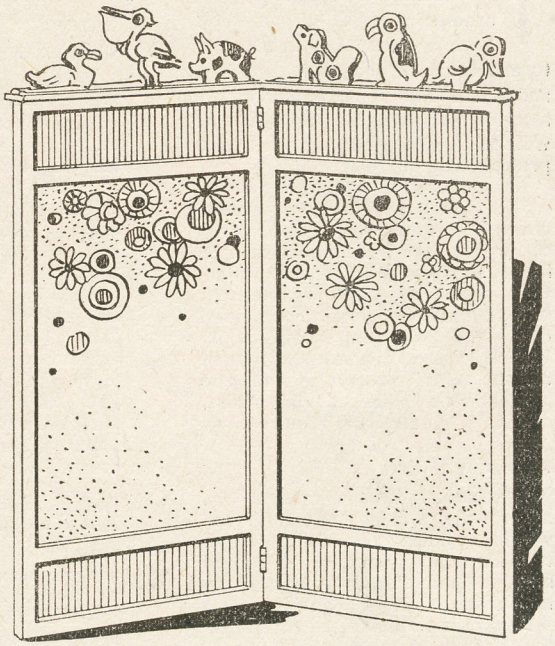
The large middle panels of each leaf are open and can be filled with fabric or paper as previously suggested.

The framing consists of uprights and cross rails of 1¼ins. by ⅜in. battening, the infilling to the uprights of the larger panels being 1½ins. wide to allow of the fabric being stitched or tacked round. In Fig. 2 a section of the top corner of one of the leaves is shown, the filling-in panel being seen projecting below the second cross rail down from the top.

The side uprights of the screen will run right through from the floor level to the extreme top of the upper cross rails.

The wood filling between these pieces, where the large middle panels occur, will be 1¼ins. wide as seen in the cross section in Fig. 3. Thus a kind of rebate is made all round the larger panels to which, as before stated, the fabric or other panel filling is fixed.

Some little care, it will at once be seen, is therefore necessary in the setting out of the measurements and the correct butt joints of the various rails, but all is simply explained by Fig. 1, and the enlarged details in Figs. 2 and 3.



Animal Figures

The novelty of the screen is in the row of little animals and birds along the top. All these are made up separately and are interchangeable as regards positions because they fit down between two shaped fillets of wood as shown in Fig. 3. These fillets of wood really form a groove which should be so spaced that the cut-out wood figures are held firmly without being fixed by glue or otherwise.

Before the grooves are made, however, a capping might be put to the top rails of the screen. Here again some 1¼ins. by ⅜in. pieces may be used, and a section through this capping and the grooving fillets can be seen in Fig. 3.

The capping pieces are nailed direct to the two side members of the top cross rail. Wood ¼in. thick would be suitable for the figures, and some amusing outlines for these are given in Fig. 4. Enlargements could be made from the outlines to whatever size is desired, but they should not be too large or overpowering. The pig and the duck should be about 4ins. long, the upright bird figure being about 5ins. high.

They may be cut out with the fretsaw and then coloured gaily in poster paint or ordinary paint or enamel. Again some nursery rhyme pictures would look well cut and adapted for the display. Indeed the same pictures cut round with the scissors and stuck down to the panel fabric would make again an attractive filling.

The woodwork of the screens would look best, we think, painted in pastel tints, these being laid over an undercoat of white or cream paint.

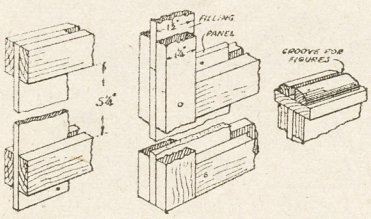


Fig. 2—Top end joints

Fig. 3—Frame construction

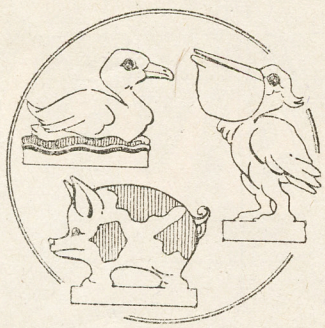


Fig. 4—Outline of figures

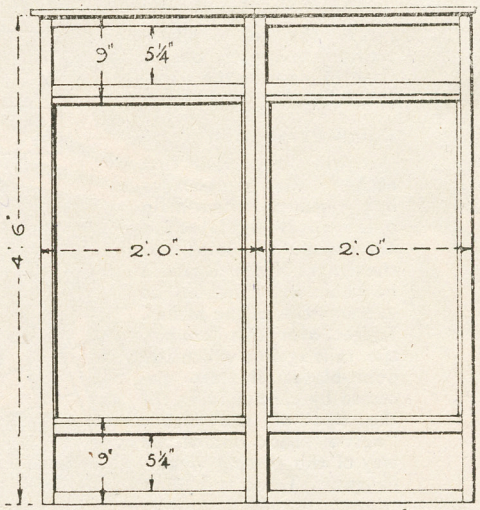


Fig. 1—Outline and measurements of framework strips

Some helpful notes on building suitable track for your MODEL RAILWAYS

THE making of a right or left hand point in "O" gauge, using steel or brass rail is not the formidable task one might imagine, and if due care in measurement and assembly is taken the resultant job will compare very favourably with the professionally-made article.

As to materials needed for a 3ft. radius right or left-hand turnout, these are both cheap and easily obtainable. For the sleepers, a three feet run of $\frac{3}{8}$in. by $\frac{1}{4}$in. wood (preferably hardwood) will be needed, together with 6ft. of rail. Four dozen chairs and a 6in. length of $\frac{1}{4}$in. by 1/16in. brass, with a few pennyworth of fine brass pins which will pass through the holes in the chairs, complete the materials required.

Everyday Tools

As to tools, a light hammer, an 8in. smooth file, a soldering bit (of $\frac{1}{4}$lb. weight), solder and acid flux are all that are really necessary. A pair of small pliers and a brad-punch are also helpful for driving inaccessible pins.

A start can be made by cutting up the sleeper material as follows:—three 3in. sleepers, one 3$\frac{1}{2}$ins., two 4ins., one 4$\frac{1}{2}$ins., one 5ins. and one 6ins. After this the rail can be cut into two 15in. lengths, two 11in. lengths, one 4in. length and one 3$\frac{3}{4}$in. length. The two check-rails are each 3$\frac{1}{2}$ins. long.

Having got the materials in handy form, the next job is to draw on a sheet of brown paper a full-sized outline of the point under construction—right or left-hand, as the case may be. Strike the 3ft. radius with the aid of a pencil and a piece of string, and use the floor as a drawing-board. The centre-lines of all the sleepers should be marked on the drawing so the point can be assembled on the latter direct.

Forming the Curve

One of the 15in. lengths of rail is now gently persuaded into a 3ft. radius curve by running the thumb and forefinger down its length. Always work from one end, and take great care to see no kinks are formed. The rail should be "rolled" rather than "bent" into the curve.

Nine chairs are now threaded on to the curved 15in. rail, and also on to the 15in. straight length. The sleepers are selected according to their lengths and temporarily pinned down into their positions on the drawing. The latter should be placed upon a flat surface of wood to serve as a working surface. From left to right the sleeper lengths will be:—3in., 4in., 3in., 3in., 3$\frac{1}{2}$in., 4in., 4$\frac{1}{2}$in., 5in,. and one 6in. one cut at an angle to form two 3in. sleepers.

Fixing to Sleepers

The straight 15in. rail-length is now set upon the sleepers, and all its chairs spiked down, starting at each end and finishing in the centre of the length. Next the 4in. straight length of rail (B) has one end cut to an angle at one end to match the 3ft. radius curve. Two chairs are threaded on and the length spiked down to dead 1$\frac{1}{4}$in. gauge with the 15in. straight.

Next the 11in. curved rail is taken and spiked to 1$\frac{1}{4}$in. gauge at the "entry" end of the point, and spiked again to true gauge with the chamfered end of the 4in. straight piece (B). All the intermediate chairs on the 15in. curved rail are next spiked down, aligning the rail over the drawing.

A Snug Fit

A very slight bend should now be put on the 3$\frac{3}{4}$in. piece of rail (C), and one of its ends should be chamfered off to make a nice snug fit with piece B. Two chairs should be threaded on to it, and it should be spiked into place with the utmost care; for it is at the "frog" (as the joining point of rails B and C is called) that derailments are most likely if shoddy construction is used.

If possible these two rails should be soldered together at the angle where they join, and much greater strength will be produced if this course is followed.

We now have the point in skeleton form, and the point-blades are now taken in hand. One of the 11in. rail-lengths (E) should be bent to the shape on the drawing, four chairs being threaded thereon. The other 11in. piece (F) is similarly treated, and each one is tried in place on the skeleton point.

Catch Prevention

It will be noticed that each of the point-blades lies against the main outer rails (A and D) at the entry end of the point, and the flanges of wheels would be liable to catch on the extreme tips of the blades. To get over this trouble, the rails against which the point-blades lie are recessed by careful filing till the tips of the blades "nestle" back out of the way of the passing wheel-flanges. To do this filing

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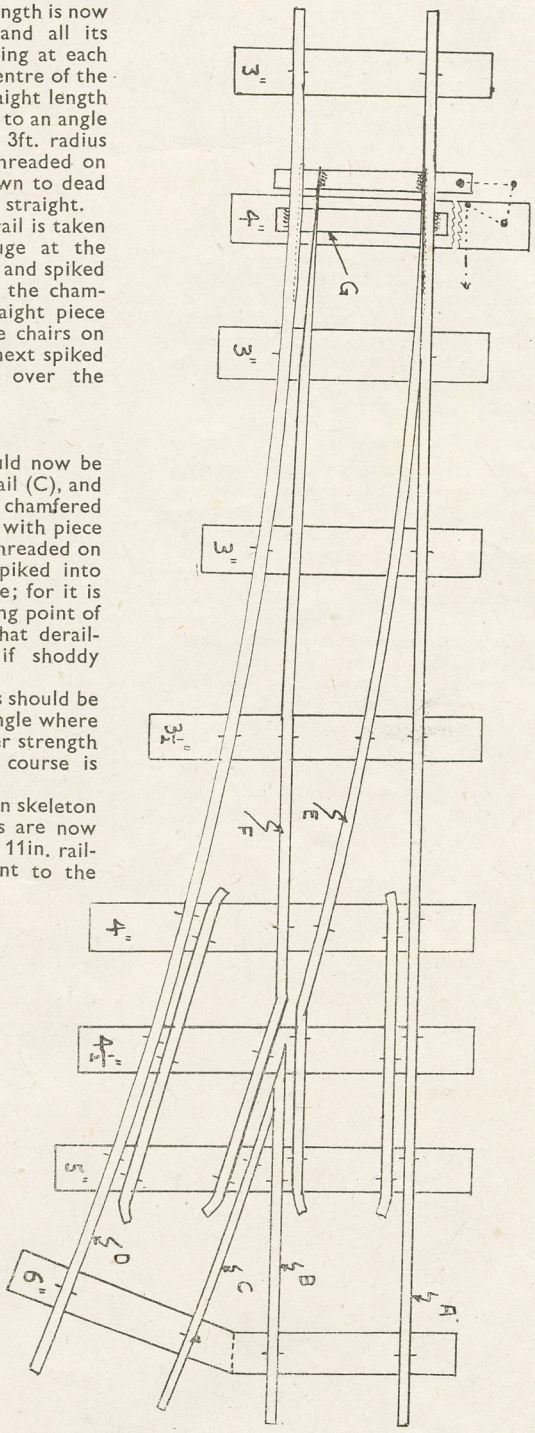
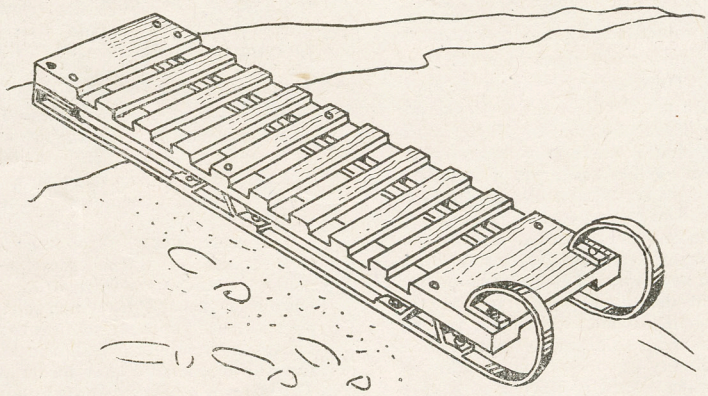


Full size track for "OO" Gauge models

Be ready for frosty fun by making this straightforward

TWO-SEAT TOBOGGAN



TWO persons can get quite a lot of fun out of the toboggan illustrated. It is a long, plain, low-built type, sliding on narrow metal runners. The latter will mean a bit of hard work, bending, drilling, etc., including the support pieces. However, the metal recommended is flat iron bar, about 1in. or so wide, by about 3/16in. thick. Mild steel is the best stuff to use.

Needless to add, both iron and mild steel bar is normally obtainable at the stores of hardware shops. It is sold by the foot or yard. It may appear rusty, but it is still in good order. Do not use 1in. wide strips cut from a piece of $\frac{1}{8}$in. sheet metal, particularly iron. The latter is too easily bent to shape and is, consequently, too easily bent out of shape.

The Framing

As shown at Fig. 1, the frame, for the runners, is 4ft. 3ins. long by 16ins. wide. This frame is made up from two runner boards 4ft. 3ins. by 3ins. by $\frac{7}{8}$in. The runners are connected together by a 10in. and $\frac{7}{8}$in. wide end piece, then eight 2in. by $\frac{7}{8}$in. cross rails. The latter, like the end pieces, are 16ins. long.

Have the cross pieces affixed with glue and oval nails. Remove all sharp edges by glasspapering in the usual way. See that the frame is not in twist.

For the runners, you need two lengths of flat bar roughly 6ft. long. Begin to prepare one runner by drilling a $\frac{1}{4}$in. hole through one end. This end is then bent into a circular shape, as shown in the side elevation, for connection to the framing with a bolt.

The bar is kept straight for 4ft. 3ins., then bent at right angles, bent at right angles again to give a space of 2ins. or more, then the waste cut off, and the metal bored for two $\frac{1}{4}$in. fixing bolts.

That describes one runner. The same method is applied to the second runner, which must be made identical. The runners need to be drilled and countersunk for flathead machine screws. The latter are used for fixing the supports in place. Great care is needed to have the holes bored exactly in the metal. The supports should be made first, then their position marked on the runners.

The runners are fixed to the framing with roundhead carriage bolts, $\frac{1}{4}$in. or 3/16in. thick. You need 10 bolts, with nuts and washers. If you have used $\frac{7}{8}$in. thick wood throughout the construction, the bolt shanks should be $2\frac{1}{2}$ins. long. Note the head of the bolts are at the upper side. Being roundheaded—and having a square shank at the head—the bolt heads do not sit up too much. They get a good grip in the wood, and there is no turning around when the nuts are tightened.

When the runners and supports are attached, the work is given a couple of coats of enamel paint. A light green frame, with the runners red, or black, would be a nice finish. Complete your toboggan by attaching a tow-rope. If desired, a few foot or hand grips could be provided. However, the cross rails give plenty of grip, whether one is sitting or lying prone on the toboggan.

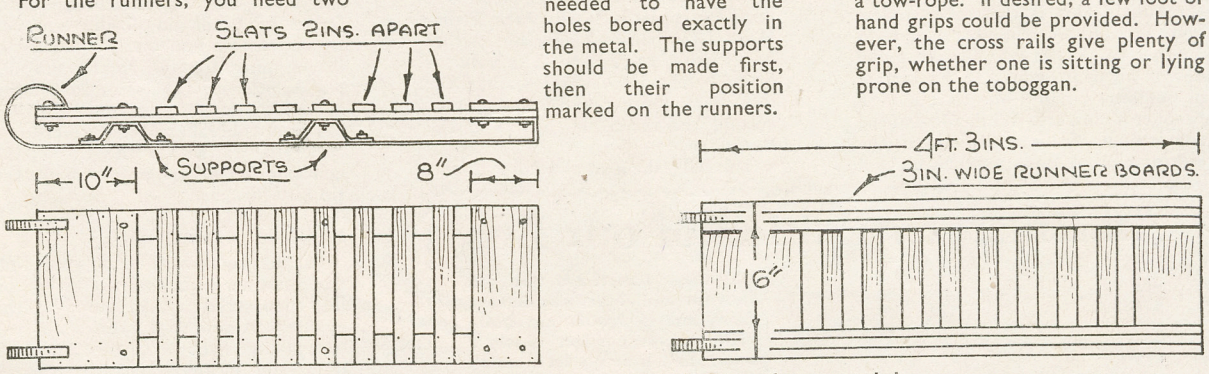


Fig. 1—Side, top, and underneath view with sizes of parts needed

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Model Railways—(*Continued from page 168*)

it may be necessary to lift the point up from the baseboard, though a better job will be made if it can be done without moving it.

When a snug fit has been made as described, the two 11in. lengths may be spiked into position on the $3\frac{1}{2}$in., 4in., $4\frac{1}{2}$in., and 5in. sleepers. Keep everything true to gauge at every step of construction.

A 2in. length of the 1/16in. by $\frac{1}{4}$in. brass strip is next soldered under the rails at the second sleeper from the entry end of the point. Its duty is to provide a sliding surface for the tips of the point-blades. Half-chairs may be placed on top of the strip of brass for appearance sake if desired.

Following on, a $2\frac{1}{2}$in. length of the brass strip is soldered to the actual tips of the movable blades, arranging matters so one blade is hard over against its recessed neighbour whilst the other is sufficiently far away from its recess to allow the wheel flanges to pass freely through the gap left. Generally speaking a gap of 3/16in. is sufficient. All surplus solder between the blade tips and the operating strip must be carefully pared away with a sharp penknife or chisel, so the blades still fit snugly into their recesses.

This completes the point apart from the cutting, shaping and fitting of the two little "check-rails" at CR. These are each $3\frac{1}{2}$in. long.

For insecticide or thin cellulose lacquer you can make

A SMALL SPRAYER

A SIMPLE, effective sprayer, for insecticide liquids, can be made quite easily from a few odds and ends. The diagram shows a type made from a metal polish tin, a bicycle air tube valve, a short length of small-bore pipe, a piece of wire and some solder. When made up, it is only a matter of screwing a bicycle pump to the end of the valve.

The container itself, as can be seen, can screw from the lid, for re-filling when necessary. The ejector pipe and the feeder pipe is soldered to the screw-off lid, of course. As a fair air pressure is obtained, the jet is reasonably good—a fine mist of atomised liquid is ejected with each inward push of the pump handle, just like ordinary insecticide sprayers.

How to Handle

The device is merely a sprayer for disinfectant, but it may be used for spraying thin cellulose lacquer, or even thin paint. The container is 4½ins. long and holds a good supply of paint, etc. Owing to the lack of an air chamber, which "balances" the supply of compressed air to the ejector, the spraying is jerky. You can, however, spray surfaces evenly enough, if care is taken to distribute the contents of the container properly with every thrust of the pumping handle.

It should be pointed out, perhaps, that the spraying is inclined to be blotchy, owing to tiny blobs of the liquid streaming out during the spraying. This is inevitable, unless you fit an air chamber (perhaps another tin) in an effort to keep the flow of air continuous. It is a matter of pumping air into one container to produce a pressure. While some of the compressed air is escaping to the ejector pipe, more is pumped in, and the flow of air through the ejector is unbroken, which means that the spraying is continuous.

The Ejector and Feeder

As stated, the ejector is made from an old air tube valve, it being necessary to cut off the blocked end, as shown. The tip of the hole is made conical by filing. Do not, at the moment, cut the shank of the valve.

You must, first of all, fit the feeder pipe to the lid of the empty metal polish tin, such as a Brasso tin. This has a special sort of lid which suits our purpose. All you have to do is to drill a hole, centrally, through the lid to suit the diameter of the feeder pipe. The latter is a piece of brass or copper pipe, about ⅛in. in diameter, with a 1/16in. hole.

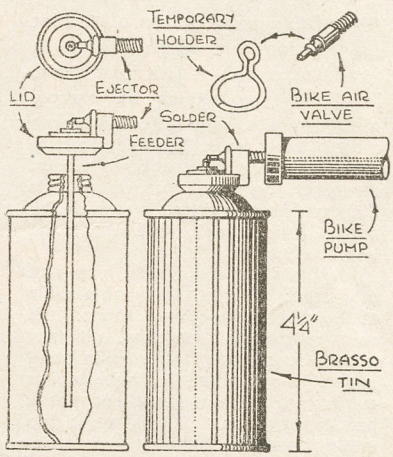
You may have some difficulty getting a piece of this piping. The alternative, therefore, is to fit an air valve, with its tip cut off and filed conically. It should be a force fit so it is held in position while being soldered to the lid.

Having attached the feeder air valve, a piece of rubber pipe is forced into the end of the valve. This pipe can be a piece of the sleeving on flexible wire. Cut off a piece of wire 5ins. long and, with the nippers, withdraw the strands of wire, thus leaving you with a piece of fine-bore rubber pipe.

Soldering the Ejector

The ejector must now be positioned in alignment with the tip of the feeder. Make a temporary holder for it from heavy wire, as shown. The valve is fitted to the loop in same, then the ring of the wire forced into a groove around the inside of the lid of the container.

This will take a lot of fiddling about, pressing the wire and making necessary adjustments with pliers. You must have the tip of the ejector resting on the tip of the feeder, as in the diagrams. When you get both adjusted properly, apply the solder. Build up the solder around the ejector to give it plenty of strength, remembering that it is by the threaded end of the ejector that the weight of the container is maintained.



Details of the simple apparatus

The Solder to Use

We show the solder applied to be a solid block. You can file it up later on. Use a cored solder, incidentally. A single cored solder could be used as a feeder pipe, the flux being removed by inserting a fine wire. Be sure the lid is quite free of grease and old polish, otherwise the solder, despite a good flux, may not fuse to the tin.

Do not break up the silver-lined cork stopper within the lid of the container. This flat stopper keeps the tin airtight.

In Use

All that remains to be done is to fill the container with water, screw on the lid, then screw a bike pump to the ejector. A few sharp thrusts of the pump handle should cause a fine mist of water to be ejected.

An ordinary bicycle pump gives a good pressure of air, more particularly if the handle is pushed in with a jerk, not slowly. There is practically no pressure if the handle is operated too slowly.

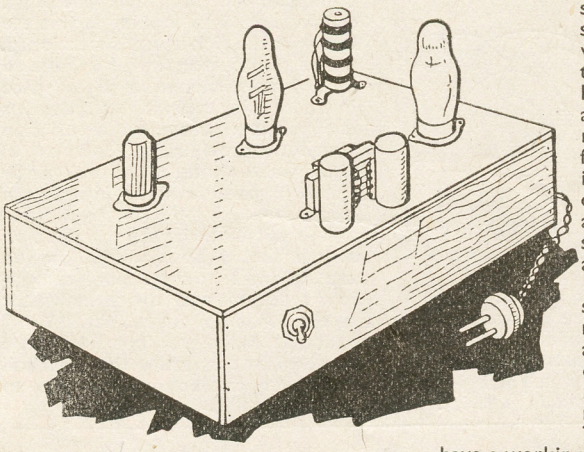
The main thing is to have the jets (ends of the feeder and ejector) meeting closely at right angles, remembering it is the flow of air over the other that produces a suction which draws up a slight trace of the liquid in the container. Upon reaching the tip of the feeder, the same flow of air blows the liquid into a mist form.

An Enlarged Edition of our Bus

Readers sometimes write in that the model they are making from our design is not quite right in proportion to their other models or the set in which they propose to use it. Well, they can always do as shown by this reader, Mr. W. J. Cook of Shepherds Bush, W.12. He took our Design 2638 for a London double-deck bus and enlarged all the parts three times the size. The result you see in the picture where his son is enthralled by the realistic and well-made toy. So at least two people are happy — Mr. Cook who had the pleasure of making the model, and his son who is having hours of delight using it.

Increase the volume of your gramophone records with an

ALL-MAINS AMPLIFIER



DESIGNED to run from any A.C. or D.C. mains supply, this amplifier is particularly suitable for use with a pick-up so that records can be played. Reproduction is then far superior to that obtained from an ordinary gramophone, and much more volume is obtained.

The amplifier uses three valves and is as simple as possible without really good results being sacrificed. Construction is naturally somewhat more complicated than with a small battery-operated unit, but no real difficulty should be encountered.

The Chassis

To give plenty of room, the chassis should be about 6ins. by 10ins. by 2ins. deep. For top, front and back three-ply can be used. The sides should be about $\frac{1}{2}$in. thick to facilitate nailing or screwing together. After glasspapering, varnish the chassis thoroughly inside and out.

The three holes for the valve-holders will require to be about 1in. in diameter (or slightly more, with some types of holder) to clear the soldering tags. When screwing down the valve-holders, note the position of the large sockets. These are for heater connections and should face the way shown in Figs. 1 and 2. The octal holder will have a key-way, and this should be positioned as shown.

Though those shown are of the upright metal can type, any other condensers can be used and the method of fixing arranged accordingly. The condensers must have a working voltage of 300 to 550 volts and though different capacities can be used, 8 mfd. is most generally suitable.

Upright condensers are usually fixed in large holes so the connecting tags are below the chassis. For square or cardboard-cased condensers a metal clip should be made.

Wiring

All connections are clearly shown in Fig. 2. Insulated sleeving should be placed over all the leads to avoid shorts and the wiring should be run approximately as shown. Keep all leads as far apart as possible, otherwise hum may be induced into the connections carrying the signal.

Note that the two 8 mfd. smoothing condensers and the two bias condensers have the polarity indicated. Do not reverse connections to any of these or they may be damaged.

The leads passing through holes 4 and 5 go to the smoothing choke, which may be any type of 20 to 40 Henrys, for 50 to 150 milliamps currents.

For the mains leads, proper stout twin-flex is used. A mains-plug or adapter is fitted to the end.

The Mains Dropper is a .3 amp, 800 ohm. wire-wound resistor intended to reduce the mains voltage to the 50 to 60 volts heater voltage required by the valves. The leads going to it are numbered in Figs. 1, 2 and 3.

From the last diagram it will be seen there are two central clips. These can be moved by loosening their screws and must be adjusted to the proper position, as will be explained, before the amplifier is connected to the mains.

Speaker and Pick-Up

Terminals (shown in Fig. 2) are provided for connections to speaker and pick-up. The speaker should be a moving-coil one with transformer for mains pentode. Do not connect phones or the small speakers intended for low-power battery sets, or these may be damaged.

For general use, the magnetic type pick-up is most popular, and some of these have volume controls incorporated. Usually they have screened leads, and connections should be made in such a way that the screened braiding is joined to the terminal which goes to the negative tags of the four condensers.

Keep speaker, pick-up, and mains leads reasonably far apart.

Valve Types

Fig. 1 shows where the valves are inserted, and equivalent types to those shown can be used. For example, numerous manufacturers produce rectifiers equivalent to the 25Y5 shown, and any such equivalents can be used. The numbers shown are those of the valves most generally available.

After checking all connections, insert the valves, wire up speaker and pick-up, and set the latter on a record.

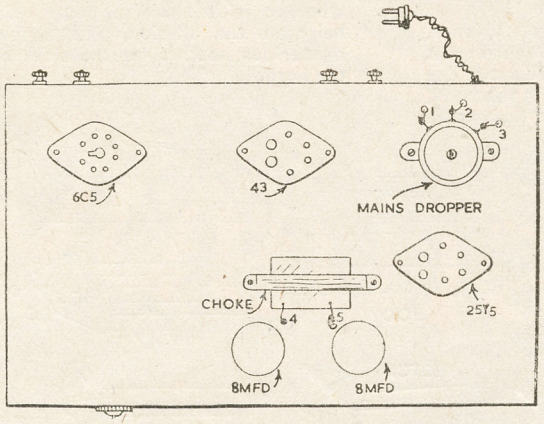


Fig. 1—Layouts of the parts on the baseboard

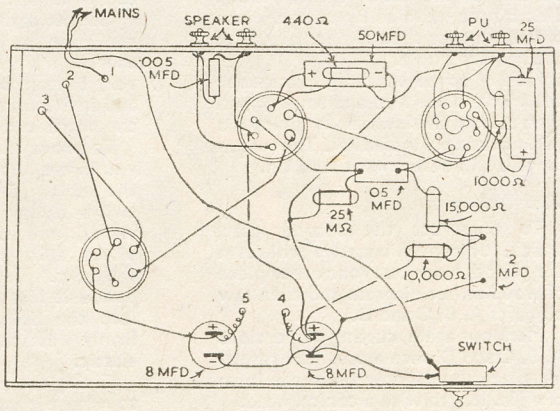


Fig. 2—The complete wiring diagram with components

The mains dropper clips should now be set in a position approximate to that shown in Fig. 3. To begin with, have clip 1 rather high, and clip 2 rather low.

Now start the turntable, plug into the mains and switch on. After approximately 45 seconds the speaker should begin to operate. If the time is longer, the heaters are not receiving enough voltage and the clip marked 1 should be put lower, a trifle at a time, until the valves reach operating temperature in about 45 seconds.

Always pull out the mains supply plug before making any adjustments, or touching any bare leads or metal parts. It is also best to allow a few minutes for the valves to cool down between tests.

When the heater voltage is found to be correct, fix clip 1. If an A.C. voltmeter is available, adjust this clip until the rectifier heater voltage is 25.

The high tension voltage can now be adjusted by moving clip 2. The higher this clip, the higher the voltage. A position midway between clips 1 and 3 will be suitable, and the setting is not critical. It is not likely the full volume of which the amplifier is capable will be required, but if it is, then this clip (No. 2) can be raised a little to increase the H.T. voltage.

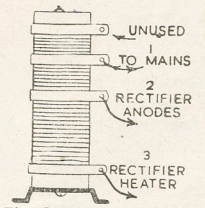


Fig. 3—Mains dropper connections

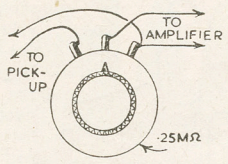


Fig. 4—Volume control wiring

Once set, the clips do not need moving, unless the mains voltage used is changed. If the amplifier is used on D.C. mains and no signals are obtained, withdraw the mains plug and give it a half turn to obtain polarity.

If the pick-up has no volume control a potentiometer of about .25 to .5 megohms can be connected as shown in Fig. 4. It is usually most convenient to mount such a control on the motor-board near the gram turntable. If the leads are long, screen them with brading as was the case with the pick-up leads mentioned.

The constructor should be able to build a cabinet, or make use of space in the existing cabinet. As the mains dropper becomes hot, ventilation should be provided by a number of ½in. diameter holes at the back, or by leaving a space through which air can circulate.

It is not essential the mains on-off switch should be mounted on the chassis, and it may be more convenient to fix this near the turntable, or to the outside of the cabinet.

Local radio stations may be received by connecting the usual coil and tuning condenser to the pick-up terminals.

Mystify your friends by making and operating this

SIMPLE WOODEN PUZZLE

THIS wooden puzzle, guaranteed to baffle even the cleverest among your friends, can be made at home, quite easily and with little effort. All you require in the way of materials are two pieces of wood, 2ins. long by ¾in. square. Any scrap pieces will serve the purpose.

Your first piece, which is to form the body, will require a ¼in. hole down the centre to a depth of 1½ins. By drawing the diagonal lines across one end of your piece of wood you can easily find the exact centre for marking.

The hole itself can best be sunk with the aid of a brace and bit, but in the absence of this tool, a red-hot iron can be used instead, though it will be a much slower job.

In using the latter it is as well to remember that a red-hot iron creates a larger diameter hole, owing to the burning of the sides while boring. This can be nullified by using a piece of iron smaller than the actual size of the required hole.

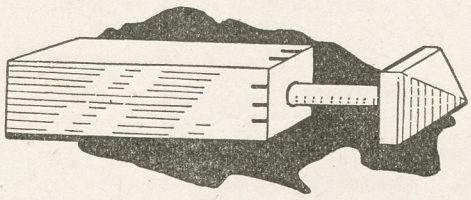
Having bored the hole, glasspaper the whole piece nice and smooth and then darken the interior by giving it a slight coating of indian ink. The reason for this will be apparent later on.

The Piston

To construct the second part, which, for convenience we will term the piston, mark out your other piece of wood as per diagram and then saw off parts A, B, C and D.

Mark out again, cutting off portions A, B, C and D once more. The resulting piece should now be in the form of a ¼in. length with a conical head.

The ¼in. arm portion must now be



filed perfectly round, seeing that you keep it quite straight. It is essential that it should, when finished, be a comfortable sliding fit to the hole in the body. Avoid getting it too small as there must be only a minimum of side-play—just sufficient to allow the piston to slide in and out of the body with a smooth gliding motion.

To complete the piston, cut a small notch in the arm, as near to the end as you can get it. The whole piston must be scrupulously smoothed with glasspaper, paying particular attention to the conical head.

Get hold of one of your friends, show him the puzzle, and explain that there is a small loop of elastic at the very bottom of the hole in the body, and invite him to try and hook it on the notch in the piston.

To prove it can be done you insert the piston into the hole, give it a few twists backwards and forwards, and then pull the piston a little way out of the hole. Each time it is pulled it flies forcibly back into the hole, apparently firmly attached to the elastic.

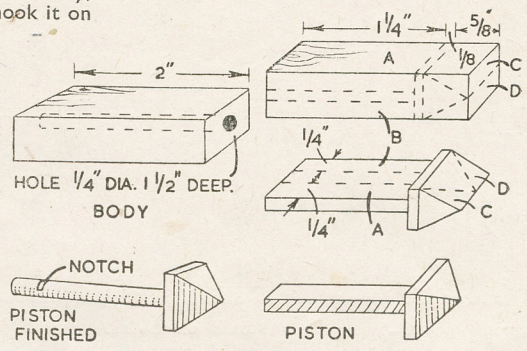
Giving the piston a twist to release it from the elastic you hand it to your friend. Twist and turn as he will, he is absolutely unable to snare the elusive elastic, and never will, no matter how many time you demonstrate the feat before his astonished eyes.

The Secret

The reason he is unable to hook the elastic is simply because there is not any there. The effect is achieved by holding the conical head between the thumb and forefinger, it being only necessary to squeeze slightly to cause the piston to fly back in the most realistic manner, just as if it were, in fact, hooked on a piece of elastic.

Naturally it is essential that the conical head be very smooth or the trick will be impossible. A touch of candle-wax or french chalk on the fingers will help.

If he tries to look down the hole to see where the elastic is, the inked interior effectively prevents his seeing whether it is there or not. To heighten the illusion, file a few mysterious notches on the sides of the head.



Some practical hints to better your work with a

PLANE IMPROVEMENT

THERE are, as most woodworkers know, two types of wooden jack plane, apart from sizes. One is the sunk-handle type, the other is the more usual "straight" type. What, however, is the real difference between them? Does the sunk handle make any improvement in the manipulation of the implement?

It does—definitely, but, because the jack plane is used mainly for "rough" work, the design does not greatly concern the majority of users. Yet it should do so, for there are specific reasons for the low handle. The writer has tried to set them out herewith:

1.—Removal of unnecessary weight at rear end of plane body, with less "carrying" strain for the fingers, particularly when using one hand.

2.—Better balance, more comfortable "feel" and a more direct forward thrust.

3.—The lowered handle enables one to keep the elbow lower, if and when necessary, so there is less diagonal driving strain on the arm sinews and muscles. Greater force can be applied when the fore-arm is horizontal.

4.—There is less tendency for the rear end of the plane body to lift, especially when the cutter strikes a tough knot or a tough patch of cross-grain.

5.—Ordinary planing is greatly facilitated in that forward pressure is directly behind the plane cutter, that is, nearer the sole of the plane body, this being a main feature with metal planes.

6.—More self-weight at the fore-end of the plane body so that one hand often suffices when using the implement on large flat areas. It is usually essential to use one hand when, for example, one is levelling (or reducing) a large dining table top or when preparing wooden floors prior to laying parquetry work, for, owing to the stretching, one arm is needed to support one's own body.

Thus, the sunk-handle jack plane, often known as the Technical School plane, is obviously the better implement. Why the ordinary type should be more popular is due to the fact that more of them are manufactured, plus the fact that apprentices or their inexperienced fathers, do not know any better when the kit of tools is being purchased.

Therefore, readers who possess an ordinary jack plane may care to improve it by lowering the handle. This is a very easy job, although some care will be wanted, especially in respect to the cutting of the handle mortise and the fitting of the handle or toat, as it is sometimes called. The finished result is depicted at Fig. 1.

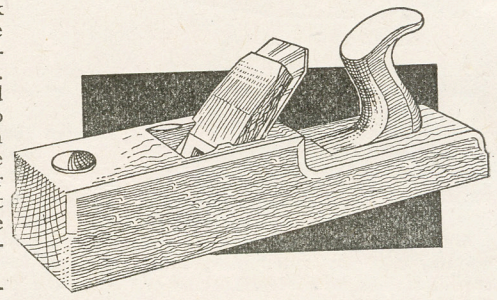


Fig. 1—The result of improvement

You will appreciate the difference better by glancing at the side views of both types of jack plane (see Fig. 2). At Fig. 3 you will see that the sunk-handle plane is not unlike the 18in. metal type. The proper name for such a length of plane is "fore plane" which, in a way, is the equivalent of "jack plane".

A 17in. Long Plane

Assuming a 17in. long wooden plane is being improved, the toat or handle is removed with the portion of waste wood to be cut from the plane body, dimensions being given at Fig. 4. To preserve the base of the handle as much as possible, the waste wood is split up and pulled away, any small chips and glue adhering being cleaned off with a chisel.

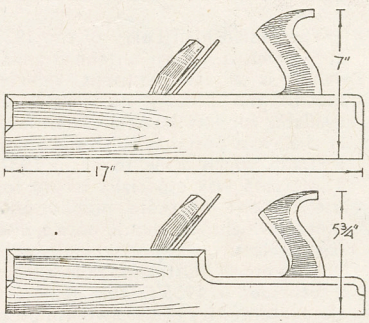


Fig. 2—Comparison of ordinary type and improved with sunk handle

Dowel for Strength

A suitable recess or mortise is made in the plane top (when ultimately dressed and glasspapered) so that the base is a neat tidy fit. Gluing usually suffices in making a strong fixture, but a dowel could be incorporated, as shown at Fig. 5.

The dowel, of course, helps to strengthen the handle, apart from making the fixture more secure. By the way, a large furniture glider tapped into the back of the plane body, with one at the fore-end, on top, will prevent damage to the wood.

Metal gliders can always be easily replaced, but a new plane body is an entirely different matter. The reason for the metal gliders will be obvious to experienced readers; one hammers upon the gliders in order to dislodge the plane wedge and irons, thereby avoiding unsightly careless dents in the wood.

Such little points of care and attention make the difference between a good and bad craftsman. Apart, of course, from the fact that badly treated tools need replacing more frequently.

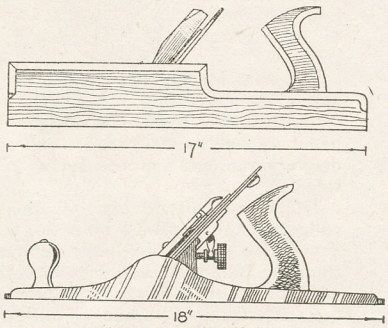


Fig. 3—Similarity of the sunk jack plane and usual metal type

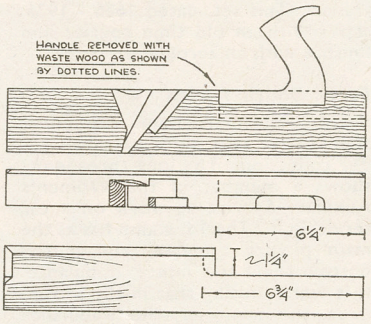


Fig. 4—Section and half top view, and detail of cut-away waste

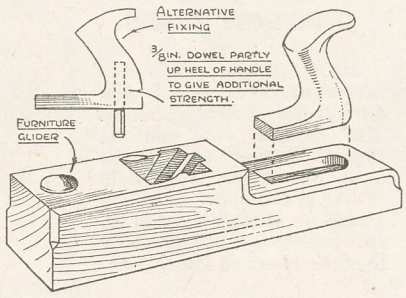
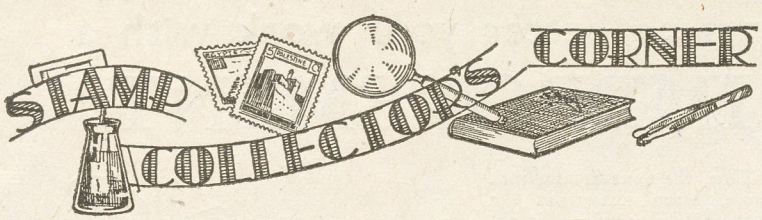


Fig 5—Detail of handle and fitting into the sunken body



MOTORING ON STAMPS

HOW many motors can you find in your own collection ? Probably you cannot think of very many at first but there are plenty of stamps to be found which do have motor cars on them and some very interesting examples too.

Germany comes to mind as the country that has issued most automobile stamps, with New Zealand or the United States of America second. In 1936 there was the Berlin Motor Show which was also the date of the fiftieth anniversary of the invention of the first motor car.

For this two stamps were issued showing the portraits of Gottlieb Daimler and Carl Benz. Again, in 1939, there was an International Motor Show at Berlin and for this one three stamps were issued. Each bore a premium for Hitler's Culture Fund. One stamp showed a racing motor car, another a German people's car. The third was an illustration of two very early types of cars, one a Benz and the other a Daimler. These two look very like some of the models seen in the annual "Old Crocks" race to Brighton !

New Zealand Car Express

Swedish truck and trailer

Sahara motor crossing

A Frontier Road

In connection with motors one must also consider roads, and some countries have illustrated some of their best roads on stamps. Germany in 1936 gave a view of the Munich Frontier road. France, in 1937, issued a special stamp commemorating the opening of the Col de l'Iseran route. This road is some 2,769 metres up, or about 6,000 feet.

New Zealand has been mentioned, and the 6d. express delivery stamp which is illustrated shows quite a modern car. The ½d. value of the Chamber of Commerce set shows an up-to-date truck transporting one of the country's most important products—wool. If you look carefully at the 2d. value of the new Otago Centennial set you will see a touring car travelling along the road.

Model of a Car

Bosnia and Herzegovina in 1906, on the 50 heller value, shows what then was no doubt a fine model. But now, well—as it has solid tyres and an open driving cab it would cause amusement rather than wonder and pride.

The Indian Mail Lorry of the 1937 set, which is shown on the 8 annas value, is a very efficient vehicle. Notice the posting box which is available for late letters. Then look at the Swiss postal van also shown on a stamp which came to us in 1937. The stamp was especially issued for use on one of these mobile post offices, which, you should notice, also has wireless.

The second illustration comes from a set issued in 1936 to commemorate the tercentenary of the Swedish post. It is the 50 ore value and as will be seen, shows a motor bus with a trailer. This set, dated 1636 - 1936, starts with an old time courier and finishes with an aeroplane.

From South Africa

The South African War-Effort stamps give two more examples for our collection. The long threepenny shows a member of the Women's Auxiliary Service at work on a car servicing it. The 1d. stamp has as the main picture a nurse, but at the bottom there is a motor ambulance. It is worth noting that in the second issue, the small set, the ambulance has disappeared.

The large stamp of the Spanish series for the 40th anniversary of the Madrid Press Association shows a stream of motor cars passing the Press Association Buildings. This is one of the new stamps to be found with such a number. The 6d. Jamaica of 1936 is like the New Zealand Otago stamp—it has a touring car on the road by Priestman's River, Portland.

President in a Jeep

One of the most up-to-date motor stamps is of a set issued in memory of the late President Roosevelt. It depicts him as riding in a jeep reviewing troops, and comes from Liberia. Another up-to-date model is shown as the next illustration of a stamp which comes from Tunis. This country is, of course, on the edge of the great Sahara Desert in Africa and the stamp pictures a car specially equipped for travelling over the sand.

The United States of America also has a number of stamps with motor cars; it must be so with the tremendous number she has issued. The first was the 1901 issue for the Pan American Exhibition at Buffalo, which shows one of the old type with the driver perched high up over the front wheel. Next we go to the special delivery stamps of 1922 and 1924, the 20c. stamp and the 15c. parcel post stamp.

For Express Delivery

We could hardly leave these motor stamps without mentioning motor cycles — like the United States with her Special Delivery stamps having motor cycles for the lower values. Quite a number of countries depict motor cycles on their express letter stamps—Egypt, Spain, and Russia. The last mentioned stamp is illustrated and is a fine example of a despatch rider.

The despatch rider for speed

Bulgaria for her express stamps of 1939 has three designs—a pedal cyclist messenger, an express delivery van, and a motor cyclist and side car.

Quite an interesting, if small, collection can easily be built up, but if one also includes military vehicles then the collection would be increased enormously. Russia in particular has a considerable number of military stamps issued mainly after the war period.

GALLEON GUNS

Brass tubing of small diameter makes realistic gun barrels for model galleons. The muzzle end can be slightly "belled" out and the other end driven into a hole drilled in the hull. This hole should be slightly smaller so the tubing will wedge itself in when knocked into place.

EASY TO MAKE and weave on the Meopham Hand Loom, rugs or silk scarves. C.W.O. 3/6. Drawings, etc.—Hodgkinson Bros., Meopham Green, Kent.

FREE! 10 Japan. Request approvals, postage 2½d.—Fantozzi (HW), Whitegate, Northwich, Cheshire.

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STAMPS on approval, 3 a penny.—Jeffreys, 2 Bay View, Craigavon, Port Talbot, Glam.

STAMPS, special offer. Bargain packets 5/-, 10/- and £1. British Colonials or whole world. Satisfaction guaranteed. Sent on three day's approval against cash. Write for list of packets. Approvals on request.—W. E. G. Smith, Clarendon, Brettell Lane, Stourbridge.

PROFITABLE hobby—make leather goods and help production. Write for details, etc.—Dept. 39, Wearwell Products Co., Saxone Buildings, 2 Tarleton St., Liverpool.

SUPERIOR gift to approval applicants enclosing 3d. stamp.—Greenwoods (Dept. H.), 95 Palmerston Road, Boscombe, Hants.

POST FREE—fascinating steel tracing machine for copying and enlarging magazine drawings, maps, etc. Price 5/-.—Clayton, 16 Westminster Road, Bradford.

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CRYSTAL sets. Tune 200—550 metres. Clear instructions, crystal and all parts (except simple wooden frame). Full volume guaranteed. Batteries unnecessary. 3/6. Matchbox crystal sets. Instructions and all parts except matchbox, 3/-. Electric buzzers. Instructions and all parts (wire, trembler, tapper, etc.) except wooden base. Morse Code included, 2/6. All post free by return.—E. S. Radio, Hillworth, Longdon, Tewkesbury, Glos.

HAPPY CIRCLE—get acquainted! Pen-pals everywhere.—18 Upper North St., Brighton.

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STAMPS—100 good Brit. Cols. all different, including Mints and Commems., 2/6.—H. Tucker, 13 Milton Crescent, Ilford.

LONELY? Then write Secretary U.C.C., 5B.B. Hay St., Braughing, Herts. Genuine. Est. 1905.

BE Taller. Quickly! Safely! Privately! No appliances—no tablets—no dieting. Details 6d. stamp.—Malcolm Ross, Height Specialist, BCM/HYTE, London, W.C.1.

MODELS: you can make lasting stone-hard models with Sankey's Pyruma Plastic Cement. Supplied in tins by Ironmongers, Hardwaremen and Builders' Merchants. Ask for instruction leaflet.

TRANSFERS for decorating toys, trays, furniture, fancy goods. List and samples free. Flowers, pixies, dogs, nursery rhymes.—H. Axon Harrison, Jersey.

FOR your Hobbies Exposure Meter light cells 6/6. Meter movements 7/10. Moulded cases 8/10. All post free.—Surpluses, 8 Shanklin Drive, Filton, Bristol.

FREE! 60 assorted "Greet-o-Tabs"—the latest letter-writing craze to all sending 1/- for our latest catalogue of books, course, novelties, etc.—Hazlehurst's, 25 Melrose, Hoylake, Cheshire.

LEATHER, Perspex, Wood, Lampshades, can now be easily embossed with names and decorations in gold, silver, colours, with "Monogold". Complete outfit including tools, materials, instructions 7/6. Details free. Agents wanted.—Dawson, Dept. M.1, 130 Park Street, Oldham. Also from Hobbies Branches.

COPPER wires. Enamelled, cotton, silk covered. Litz. Most gauges. Ebonite, Tufnol, Paxolin tubes, rods, panels. B.A. screws, nuts, washers, soldering tags, eyelets. Wireless crystals, permanent detectors. Latest radio publications. List S.A.E. write P.R.S., 33 Bourne Gardens, London, E.4.

M.O. Magazines are for ambitious people. As a special introductory offer we will send six different magazines (including American) for 1/3, post free.—Hazlehurst's, 25 Melrose Avenue, Hoylake, Cheshire.

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MAKE money from making models. See our new instructive book on this subject. Post 2/9.—Sutton Models, Billericay.

PRESSED Metal wheels. Per dozen, ¾in.—9d. 1in.—1/-. 1¼ins.—1/3. 2ins.—1/6. 2ins. (special quality) 1/9. Per gross, ¾in.—6/6. 1in.—7/6. 1½ins.—9/-. 2ins.—12/-. 2ins. (special quality) 15/-. All prices inclusive of purchase tax, postage and packing. Immediate despatch. Doll's house windows, doors, fireplaces. Illustrated catalogue 3d. (Trade supplied).—Jasons, 135 Nags Head Road, Ponders End, Middlesex.

DOLL'S house fittings and papers, send S.A.E. for list. Doll's house plan special, send 2/6. Trade supplied.—Zimplan, 88 Ware Road, Hoddesdon.

ALL-METAL Chassis designed for mounting animal, etc., cut-outs. Green platform (6ins. by 2ins.), fitted with 1½ins. red or yellow wheels. Stove enamel finish. 1/9 each, post paid. Reduction for quantities.—Joyden Toy Co., 193 Chase Side, London, N.14.

SPOKE wheels, treaded tyres, 8ins., 9ins. and 12ins. overall diameter. Also rubber tyred metal disc wheels ranging from 2ins. to 9ins. Small or large quantities supplied. Write requirements.—Joyden Toy Co., 193 Chase Side, London, N.14.

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J. McGARRIGLE & Sons for aeroplane and ship kits. All accessories, new illustrated price list 6d. Wholesale lists 9d. Retail stamps list 4d.—43 Purbeck Road, Romford.

TOY casting moulds, farm animals, soldiers, wallplaques, ornaments, dogs, etc. The largest selection of metal and plaster moulds available. 6d. illustrated catalogue, S.A.E. for list.—Nuthall, 69 St. Marks Road, Hanwell, W.7.

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